

What is claimed is:

1. A projection objective defining a maximum lens diameter (D2) and comprising:

a plurality of lenses defining an object plane (0) and an image plane (0');

5 at least two of said lenses having respective mutually adjacent lens surfaces which are aspheric to define a double asphere;

said double asphere being mounted at a distance from said image plane (0') corresponding at least to said maximum lens diameter (D2);

10 the lenses of said double asphere defining a mean lens diameter; and,

said mutually adjacent lens surfaces being mounted at a spacing from each other which is less than half of said mean lens diameter.

2. The projection objective of claim 1, wherein said plurality of lenses defines at least two constrictions.

3. The projection objective of claim 1, comprising at least two of said double aspheres and said spacings thereof are equidistant.

4. The projection objective of claim 3, wherein the radii of the best-fitting spherical lens surfaces of one of said double aspheres differ from one another by less than 30%.

5. The projection objective of claim 1, wherein the apex radii

of the best-fitting spherical lens surfaces of a double asphere, which are assigned to the respective aspheric lens surfaces (AS1 to AS4), differ from one another by less than 30%.

6. The projection objective of claim 1, wherein the diameters of the first thirteen lens surfaces hardly differ from each other, preferably by less than 10%.

7. The projection objective of claim 1, wherein a numerical aperture of at least 0.8 is made available by the double asphere.

8. The projection objective of claim 1, wherein a numerical aperture of at least 0.9 is made available by the double asphere.

9. The projection objective of claim 1, wherein two mutually adjacent lens surfaces define an intermediate space chargeable with a fluid.

10. The projection objective of claim 1, wherein at least 40% of the lenses are spherical.

11. The projection objective of claim 1, wherein at least 60% of the lenses are spherical.

13. A refractive projection objective defining a maximum lens diameter (D2) and comprising:

at least five lens groups (G1 to G5) having lenses defining lens surfaces and defining an object plane (0) and an image plane (0');
5

at least two of said lenses having respective mutually

adjacent lens surfaces which are aspheric to define a double asphere; and,

10 said double asphere being mounted from said image plane (0')
at a distance of at least said maximum lens diameter (D2).

14. The refractive projection objective of claim 13, wherein said plurality of lenses defines at least two constrictions.

15. The refractive projection objective of claim 13, wherein the aspheric surfaces (AS1 and AS2, AS3 and AS4) are arranged on different lenses (L).

16. The refractive projection objective of claim 14, wherein all aspheric lenses (L104, L105, L107, L111, L203, L204, L206, L211) are mounted ahead of the first constriction.

17. The refractive projection objective of claim 13, comprising two of said double aspheres and the mutually adjacent lens surfaces (AS1 and AS2, AS3 and AS4) of each double asphere are mounted at a spacing from each other of at most their mean half
5 lens diameter measured from the optical axis.

18. The refractive projection objective of claim 17, wherein the mutually adjacent aspheric lens surfaces of each of said aspheres (AS1 to AS4) defines an air gap measured on the optical axis of a maximum of 20% of the mean radius of the corresponding
5 asphere.

19. The refractive projection objective of claim 13, wherein a numerical aperture of at least 0.8 is made available by the

double asphere.

20. The refractive projection objective of claim 13, wherein a numerical aperture of at least 0.9 is made available by the double asphere.

21. The refractive projection objective of claim 13, wherein two mutually adjacent lens surfaces define an intermediate space chargeable with a fluid.

22. The refractive projection objective of claim 13, wherein at least 40% of the lenses are spherical.

23. The refractive projection objective of claim 13, wherein at least 60% of the lenses are spherical.

24. A refractive projection objective comprising:
two lens groups of negative refractive power; and,
at least one of said lens groups of negative refractive power including only two lenses of negative refractive power.

25. The refractive projection objective of claim 24, wherein the other one of said lens groups of negative refractive power has maximally two lenses of negative refractive power.

26. The refractive projection objective of claim 25, wherein said lens groups define at least two constrictions and an aspheric lens surface is arranged in the second constriction.

27. The refractive projection objective of claim 25, further

comprising a lens group of positive refractive power including at least one lens (L720, L722, L723) having an aspheric surface; and, a diaphragm (AP) mounted in said lens group of positive refractive power.

28. The refractive projection objective of claim 24, further comprising at least two lenses having respective mutually adjacent lens surfaces which are aspheric to define a double asphere.

29. A projection exposure system defining an optical axis and comprising:

an illuminating unit mounted on said optical axis for transmitting a light beam along said optical axis;

a projection objective arranged on said optical axis downstream of said illuminating unit;

a mask held in the beam path of said light beam between said illuminating unit and said projection objective;

a substrate holder for holding a substrate in said beam path downstream of said projection objective; and,

said projection objective defining a maximum lens diameter (D2) and including:

a plurality of lenses defining an object plane (0) and an image plane (0');

at least two of said lenses having respective mutually adjacent lens surfaces which are aspheric to define a double asphere;

said double asphere being mounted at a distance from said image plane (0') corresponding at least to said maximum lens diameter (D2);

the lenses of said double asphere defining a mean lens diameter; and,

said mutually adjacent lens surfaces being mounted at a spacing from each other which is less than half of said mean lens diameter.

30. A method of making a microstructured component utilizing a projection exposure system including an illuminating unit mounted on said optical axis for transmitting a light beam along said optical axis; a projection objective arranged on said optical axis downstream of said illuminating unit; a mask held in the beam path of said light beam between said illuminating unit and said projection objective and said mask holding a pattern; a substrate holder for holding a substrate in said beam path downstream of said projection objective; and, said projection objective defining a maximum lens diameter (D2) and including: a plurality of lenses defining an object plane (0) and an image plane (0'); at least two of said lenses having respective mutually adjacent lens surfaces which are aspheric to define a double asphere; said double asphere being mounted at a distance from said image plane (0') corresponding at least to said maximum lens diameter (D2); the lenses of said double asphere defining a mean lens diameter; and, said mutually adjacent lens surfaces being mounted at a spacing from each other which is less than half of said mean lens diameter, the method comprising the steps of:

providing said substrate as a substrate having a light-sensitive layer thereon;

holding said substrate in said beam path exposing said light-sensitive layer with ultraviolet laser light from said

25 illuminating unit; and,

 developing the exposed light-sensitive layer to structure
said substrate to have said pattern of said mask.